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EXAMINER

RAIZEN, DEBORAH A

ART UNIT

PAPER NUMBER

2873

DATE MAILED: 07/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/759,806

Applicant(s)

SHAHER, DAVID R.

Examiner

Deborah A. Raizen

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-- Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period of Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 April 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-45 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10, 12, 36, 43 and 45 is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4, 6-9, 11, 13-15, 18, 19, 21, 23, 25-33 and 37 is/are rejected.
- 7) ☒ Claim(s) 3, 5, 16, 17, 20, 22, 24, 34, 35, 38, 40-42 and 44 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 January 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 15 April 2003 is: a) ☒ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Information Disclosure Statement

1. As indicated by the lines through citations on several of the forms PTO-1449 (copies of which were returned to applicant in paper #10), those cited references (lined through with no correction) were not considered. As is clear from the contents of those references, the citations are in error. However, the references that are likely to have been intended by citations 25 and 33 of paper #7 were cited by the examiner on PTO-892 of paper #10 and by applicant on PTO-1449, paper #6. Also, the reference that is likely to have been intended by the citation of Shimizu (5,575, 207) is Foo (5,515,207), which was cited by applicant on PTO-1449, paper #7, and has been considered.

Drawings

2. The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on April 15, 2003, have been approved. A proper drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

Claim Objections

3. Claim 35 is objected to because of the following informalities: in line 6, the word "group" is missing after "dioptric". Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1, 2, 4, 7, 8, 14, 15, 18, 19, 21, 23, 25, 26, 28, 32, 33, and 37 are rejected under 35 U.S.C. 102(e) as being anticipated by Schuster (6,169,627, cited in applicant's IDS, paper #7).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C.

102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

In regard to claim 1, Schuster discloses a microlithographic reduction projection catadioptric objective (Fig. 1) having an image side (61) and an object side (0) and curved mirrors (21 and 23) and being devoid of planar folding mirrors, comprising an aperture plane (pupil P near lens surface 54, col. 3, lines 3-6 and 54-55) on the image side (on the right side) of a most imagedward curved mirror (optically 23, or spatially 21). Alternatively, diaphragm 22 is located at an aperture plane, which is on the image side of a most imagedward curved mirror (optically, 23).

In regard to claim 2, Schuster discloses a microlithographic reduction projection catadioptric objective (Fig. 1) having an object side and an image side and curved mirrors (21 and 23), wherein after a most imagedward curved mirror the beam diverges (the beam diverges after intermediate image Z, which is after the most imagedward curve mirror 23).

In regard to claim 4, Schuster discloses a microlithographic reduction projection catadioptric objective (Fig. 1) having a system with an unobscured pupil (although applicant asserts that the pupil in the Schuster objective is obscured by the central bores, Fig. 1 shows that there is no central obscuration of either of the pupils located at diaphragm 22 or near surface 54; also, the edges of the bores do not obscure the pupil because diaphragm 22 acts as the aperture stop), comprising a plurality of optical elements (surfaces 1-60) and having a straight axis of symmetry of all curvatures of all optical elements (Fig. 1), wherein no more than two optical elements deviate substantially from disk form (no optical elements deviates substantially from disk form, in accordance with applicant's comment, page 13, lines 1-3 of paper #12).

In regard to claim 7, Schuster discloses a microlithographic reduction projection catadioptric objective (Fig. 1) having an object side (0) and an image side (61), comprising, in sequence from the object side to the image side, a field lens group (lens elements with surfaces 1-6), a catadioptric group (surfaces 13-22) comprising one or more negative lenses (e.g. 15-16 and 19-20) and a concave mirror (21), generating axial chromatic aberration (col. 3, lines 25-26), a group (23-29) comprising an odd number of curved mirrors (one: 23), and a positive lens group (30-60).

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In regard to claim 8, Schuster discloses a microlithographic reduction projection catadioptric objective (Fig. 1) having an object side and an image side, comprising, in sequence from the object side to the image side, a catadioptric group (surfaces 1-22) comprising one curved mirror (21) and having a negative reduction ratio (no intermediate image, as defined in applicant's remarks, paper #12, page 18), a group (23-33) comprising an odd number of curved mirrors (one: 23) and having a positive reduction ratio (there is one intermediate image, Z), and a dioptric lens group (34-60) having a negative reduction ratio (no intermediate image).

In regard to claim 14, the Schuster objective comprises in sequence from the object side to the image side, a field lens group (lens elements with surfaces 1-6), a catadioptric group (surfaces 13-22) comprising one or more negative lenses (e.g. 15-16 and 19-20) and a concave mirror (21), generating axial chromatic aberration (col. 3, lines 25-26), a group comprising an odd number of mirrors (23-29), and a positive lens group (30-60).

In regard to claim 15, the Schuster objective comprises, in sequence from the object side to the image side, a catadioptric group (surfaces 1-22) comprising one curved mirror (21) and having a negative reduction ratio (no intermediate image, as defined in applicant's remarks, paper #12, page 18), a group (23-33) comprising an odd number of curved mirrors (one: 23) and having a positive reduction ratio (there is one intermediate image, Z), and a dioptric lens group (34-60) having a negative reduction ratio (no intermediate image).

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In regard to claim 18, the Schuster objective further comprises a straight axis of symmetry of all curvatures of all optical elements (Fig. 1).

In regard to claim 19, the Schuster objective comprises an intermediate image (Z), with at least two mirrors being arranged upstream in the path of the beam (21 and 23 are upstream).

In regard to claim 21, in the Schuster objective, all lenses built in as full disks (having surfaces 1-60, except 21-23 and 50-51, which are not lenses) do not obstruct a beam path (the beam passes through them).

In regard to claim 23, in the Schuster objective, the curved mirrors have optical surfaces that comprise sections or full surfaces of revolution (col. 3, lines 36-43: the mirrors are full surfaces of revolution of the function disclosed, with h values starting at the radius of the central bore).

In regard to claim 25, the Schuster objective comprises an aperture plane (at diaphragm 22) located within a catadioptric chromatic aberration generating group (e.g. 13-22; or 13-25, because the claim does not require the group to be the same as the similarly labeled group in claim 7) comprising at least one negative lens (19-20) and a concave mirror (21).

In regard to claim 26, the Schuster objective has a field lens group next to an object plane (lens elements with surfaces 1-6) and is object side telecentric (as can be seen from the two principal rays shown leaving object plane 0).

In regard to claim 28, 32, and 33 Schuster discloses a projection exposure apparatus (Fig. 2) comprising a projection objective of Fig. 1 (204, col. 4, lines 4-7), which meets the limitations of claim 1, 7, and 8 as explained above, an excimer light source (201, col. 3, line 65), an illumination system (202), a reticle handling, positioning and scanning system (230), and a wafer handling, positioning and scanning system (250).

In regard to claim 37, the Schuster objective comprises in sequence from the object side to the image side, a field lens group (lens elements with surfaces 1-6), a catadioptric group (surfaces 13-22) comprising one or more negative lenses (e.g. 15-16 and 19-20) and a concave mirror (21), generating axial chromatic aberration (col. 3, lines 25-26), a group (23-29) comprising an odd number of curved mirrors (one: 23), and a positive lens group (30-60).

6. Claims 6, 9, 29, and 31 are rejected under 35 U.S.C. 102(b) as being anticipated by Takahashi et al. (5,835,275, cited by paper #10). In regard to claim 6, Takahashi discloses a microlithographic reduction projection catadioptric objective (Fig. 1) having an object side (R) and an image side (W), consisting in sequence from the object side to the image side of a catadioptric group (A) providing a real intermediate image (shown before mirror M1), a catoptric or catadioptric group (from M1 to M2) as a whole providing a virtual image (a virtual image is formed behind M2; applicant has argued, in response to a rejection of claim 19 based on the same reference, that a planar mirror cannot form any sort of image; it can, as explained in Morgan, p. 2, and in Smith, p. 98), and a dioptric group (B2) providing a real image (at W).

7. In regard to claim 9, In the Takahashi objective, the catadioptric group comprises a positive field lens group (the first two lens elements, at 50 mm from R) and a negative lens group next to a mirror (labeled L_C in Fig. 1), and wherein the dioptric lens group comprises more positive than negative lenses (it has two negative lens elements and five positive lens elements).

8. In regard to claim 29, Takahashi discloses a projection exposure apparatus comprising a projection objective according to claim 2 (Fig. 5, including an objective such as disclosed in Fig. 1, which meets the limitations of claim 2 as explained in paper #10 and in the Response to Arguments below), an excimer light source (col. 1, line 8 and col. 4, line 22: 193 nm is the wavelength of light from a type of excimer laser), an illumination system (12 in Fig. 5), a reticle handling, positioning and scanning system (16 and 24 in Fig. 5, col. 3, lines 28-34), and a wafer handling, positioning and scanning system (22 and 26 in Fig. 5, col. 3, lines 28-34).

9. In regard to claim 31, Takahashi discloses a projection exposure apparatus comprising a projection objective according to claim 6 (Fig. 5, including an objective such as disclosed in Fig. 1, which meets the limitations of claim 6 as explained above), an excimer light source (col. 1, line 8 and col. 4, line 22: 193 nm is the wavelength of light from a type of excimer laser), an illumination system (12 in Fig. 5), a reticle handling, positioning and scanning system (16 and 24 in Fig. 5, col. 3, lines 28-34), and a wafer handling, positioning and scanning system (22 and 26 in Fig. 5, col. 3, lines 28-34).

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10. Claim 39 is rejected under 35 U.S.C. 102(b) as being anticipated by Sato (4,757,354, cited in paper #10). Sato discloses (Fig. 10) an objective that meets the limitations of claim 4 (as explained in paper #10 and in Response to Arguments below), having an object side and an image side, wherein a most imageward mirror is convex (mirror 7, which is optically most imageward).

Double Patenting

11. A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

12. Claim 11 is provisionally rejected under 35 U.S.C. 101 as claiming the same invention as that of claim 22 (final numbering; the original number was 24) of copending Application No. 09/761,562. This is a provisional double patenting rejection since the conflicting claims have not in fact been patented (though the copending application has been allowed in February, 2003, and the issue fee has been paid).

13. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686

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F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

14. Claim 1 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 21 (the original number was 23) of copending Application No. 09/761,562. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 21 of the copending application has all the limitations of claim 1, as follows:

A microlithographic reduction projection catadioptric objective (lines 1-2 of claim 21) having an image side and an object side (line 2) and curved mirrors (line 3) and being devoid of planar folding mirrors (line 3), comprising an aperture plane on the image side of a most imaged curved mirror (lines 4-5).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

15. Claim 2 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 2 of copending Application No. 09/761,562. Although the conflicting claims are not identical, they are not patentably distinct

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from each other because claim 2 of the copending application has all the limitations of the current claim 2, as follows:

A microlithographic reduction projection catadioptric objective (lines 1-2) having an object side ("object plane", line 2) and an image side ("image plane", line 2) and curved mirrors (lines 2-3), wherein after a most imageward curved mirror the beam diverges (lines 4-6).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

16. Claim 6 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 16 (original number was 7) of copending Application No. 09/761,562. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 16 of the copending application has all the limitations of claim 6.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Response to Arguments

17. Applicant's arguments filed April 15, 2003 have been fully considered but they are not persuasive (except as indicated below). Following are responses to arguments regarding claims 2, 4, 13, 14, 19, 27 and 30.

18. In regard to claim 13, applicant argues that Williamson's explicit disclosure that "all of the mirrors ... and the refractive lens elements ... are rotationally symmetrical," in col. 6, lines 14-16, does not meet the limitation "no more than one optical element that is in a substantially non-rotationally symmetric form." However, the limitation is not defined in the present specification differently from Williamson's usage. Therefore, the invention of claim 13 is not distinguished from Williamson, and the rejection is maintained. See MPEP 2111.

19. In regard to claim 2, 14, and 19, applicant argues that the limitation "curved mirrors" makes it clear that a plural number of curved mirrors are required. However, it is not clear that a plural number of curved mirrors are required without the explicit words "a plural number" or "a plurality of". Applicant also argues that after mirror Mc and before lens Lc the beam converges so that Takahashi does not meet the limitation "after a most imageward curved mirror the beam diverges." However, examiner's previous explanation that Takahashi meets the limitation because of subsequent divergent lenses still stands, contrary to applicant's argument that later influences are of no relevance for the claim. Furthermore, the beam in fact diverges before Lc, as can be seen in Fig. 1. Therefore the rejection of claim 2 is maintained, as well as the rejection of claim 14.

20. In regard to claim 19, applicant asserts that because M2 is planar, it cannot form any sort of image. It can—see the Morgan, p. 2, and Smith, p. 98. Applicant might wish to limit the claim to a real intermediate image, which, as applicant correctly indicates, is formed in the Takahashi objective just before M1.

21. In regard to claims 4 and 27, applicant argues that Fig. 10 of Sato does not meet the limitation “an unobscured pupil” because applicant asserts that it has an obscured pupil under usage of the term in a foreign-language patent and in a copending (at the time the present application was filed) U.S. patent application, which has issued to the same assignee as the present application. However, the plain meaning of the limitation “an unobscured pupil” would not exclude the embodiment of Fig. 10 of Sato. The limitation is not defined in the present specification, except possibly by example. Also, the limitation is not used consistently in the art. Usage of the term in a cited reference that suggests a more limited meaning is not sufficient for limiting the claim because it is not clear to someone of ordinary skill in the art that an objective such as the one disclosed by Sato does not have an unobscured pupil. The rejection of claim 4 is therefore maintained, as well as the rejection of claim 27.

22. In regard to claim 30, applicant argues that “examiner gives no reasons why one of skill in the art would have expected the others to give relevant information to be combined advantageously.” However, examiner has met the burden of establishing a prima facie case of obviousness by providing reasons for combining the references, as explained on page 9 of paper #10.

23. Applicant’s arguments, see paper #12, filed April 15, 2003, with respect to the rejection(s) of claim(s) 1, 7, 18, 21, 23, 25, 26, and 28 under Williamson have been fully considered and are persuasive (in particular, for claim 1, because of applicant’s explanation of the term “aperture plane”, and for claim 7, because of applicant’s explanation of the term “field

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lens”). Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Schuster, as explained above.

24. Applicant's arguments with respect to claims 6, 9, 29, and 31 have been considered but are moot in view of the new ground(s) of rejection.

Allowable Subject Matter

25. Claims 3, 5, 16, 17, 20, 22, 24, 34, 38, 40-42, and 44 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

26. The following is a statement of reasons for the indication of allowable subject matter: The prior art taken either singularly or in combination fails to anticipate or fairly suggest the limitations of claims 3, 5, 16, 17, 22, 24, 34, 38, 40-42, and 44 in such a manner that a rejection under 35 U.S.C. 102 or 103 would be proper.

The prior art fails to teach a combination of all the features in claim 3. For example, these features include the detailed structure recited in claim 1 and also the limitation “4 curved mirrors”, which, for example, is not found in the Schuster objective.

Claims 5, 22, and 24 depend on claim 3 and therefore have allowable subject matter as well.

The prior art fails to teach a combination of all the features in claim 16. For example, these features include the detailed structure recited in base claims 4 and 15 and also the

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limitation “the dioptric lens group comprises more positive than negative lenses”, which, for example, is not found in Schuster.

The prior art fails to teach a combination of all the features in claim 17. For example, these features include the detailed structure recited in claim 1 and also the limitation “the most imageward mirror is convex”, which, for example is not found in Schuster. Sato and Phillips, Jr. et al. (cited below in the conclusion) have the limitation, but do not meet other limitations of claim 1.

Claim 34 depends on claim 17 and therefore has allowable subject matter as well.

The prior art fails to teach a combination of all the features in claim 20. For example, these features include the detailed structure recited in claim 6 and also the limitation that the image-side numerical aperture is 0.7 or greater at the specified range of image fields. Takahashi, for example, does not explicitly disclose a value for the numerical aperture, and the objective does not have such a high numerical aperture.

The prior art fails to teach a combination of all the features in claim 38 and 40-42. For example, these features include the detailed structure recited in respective base claims 2, 6, 7, or 8 and also the limitation “the most imageward mirror is convex”, which, for example is not found in Schuster. Sato and Phillips, Jr. et al. (cited below in the conclusion) have the limitation, but do not meet other limitations of base claims 2, 6, 7, or 8.

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The prior art fails to teach a combination of all the features in claim 44. For example, these features include the detailed structure recited in claim 11 (currently rejected because of double patenting, but having allowable subject matter with respect to other prior art because, for example, neither Schuster nor Takahashi has an even number greater than two of curved mirrors) and also the limitation “the most imageward mirror is convex”. Sato and Phillips, Jr. et al. (cited below in the conclusion) have the limitation, but do not meet other limitations of claim 11. Also, although several claims of copending application 09/761,562 have the limitation, none of the claims with the limitation has all the limitations of claim 11.

27. Claim 35 objected to because of an informality, but would be allowable if corrected.

The following is a statement of reasons for the indication of allowable subject matter: The prior art taken either singularly or in combination fails to anticipate or fairly suggest the limitations of claim 35 in such a manner that a rejection under 35 U.S.C. 102 or 103 would be proper.

The prior art fails to teach a combination of all the features in claim 35. For example, these features include the detailed structure recited, and especially the limitations “more than two curved mirrors” (which makes the claim novel and non-obvious over Schuster) and the limitations “consisting of”, “in sequence”, “a catoptric or catadioptric group providing a virtual image”, and “a dioptric” (which make the claim novel and non-obvious over Ishiyama et al., cited below in the conclusion).

28. Claims 10, 12, 36, 43, and 45 are allowed.

The following is an examiner’s statement of reasons for allowance: The prior art taken either singularly or in combination fails to anticipate or fairly suggest the limitations of claims

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10, 12, 35, 36, 43, and 45, in such a manner that a rejection under 35 U.S.C. 102 or 103 would be proper.

The prior art fails to teach a combination of all the features in claim 10. For example, these features include the detailed structure recited and especially the limitation “an even number greater than two of curved mirrors”, which, for example, is not found in Schuster.

Claim 43 depends on claim 10 and is therefore allowed as well.

The prior art fails to teach a combination of all the features in claim 12. For example, these features include the detailed structure recited and especially the limitation “4 curved mirrors”, which, for example, is not found in Schuster.

Claims 36 and 45 depend on claim 12 and are therefore allowed as well.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

Comments

Please note that several papers filed in connection with the current application incorrectly list in their heading the inventive entity and examiner of a parallel application.

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References to the present specification in applicant's Remarks, paper #12, are apparently references to paragraph numbers in the Pre-Grant Publication of the application, US 2002/0012100 A1.

On page 11, lines 11-12, applicant contends that the claims are not novel over Takahashi. Examiner agrees, but applicant may wish to correct the remark.

Conclusion

29. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Phillips, Jr. et al. (5,650,877) has the limitation "a most imageward mirror is convex", but does not meet other limitations of allowable claims. Ishiyama et al. (5,592,329) has some limitations of allowable claims, but not all the limitations of any of them. For example, with regard to claim 35, Ishiyama does not have the limitation "a catoptric or catadioptric group providing a virtual image" because claim 35 also has the limitations "consisting of", "in sequence..." and "a dioptric".

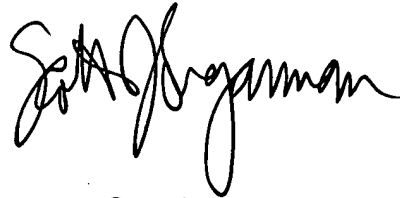
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Deborah A. Raizen whose telephone number is (703) 305-7940. The examiner can normally be reached on Monday-Friday, from 8:30 a.m. to 5 p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Y. Epps can be reached on (703) 308-4883. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

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July 11, 2003

A handwritten signature in black ink, appearing to read "Scott J. Sugarman". The signature is fluid and cursive, with the first name "Scott" and last name "Sugarman" clearly distinguishable.

Scott J. Sugarman
Primary Examiner